



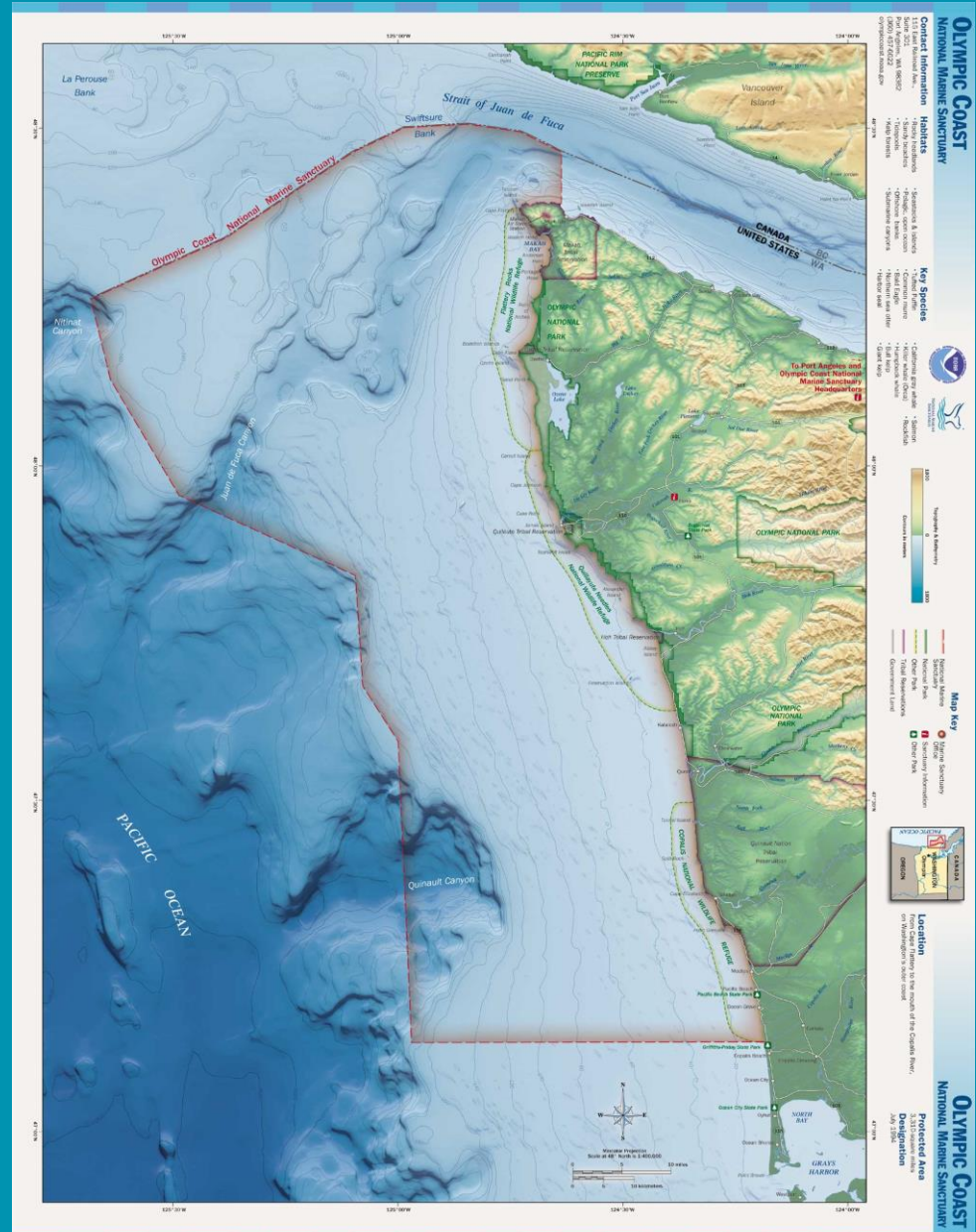
# Unmanned Aircraft Mission in Olympic Coast NMS

June 17-29, 2013

By: Ed Bowlby, OCNMS Research Coordinator

# Operating Areas in OCNMS

- 3 National Wildlife Refuges
- 4 tribal reservations
- Olympic National Park wilderness coastal strip
- FAA & Military Operation Zones



# Partners

- ONMS UAS Program
- USFWS Washington Maritime NWR Complex
- NOAA Marine Debris Program
- Washington State Marine Debris Program
- Quinault Indian Nation
- Quileute Tribe
- Olympic National Park
- Washington Dept. Fish & Wildlife
- National Marine Fisheries Service

# Two UAS Utilized

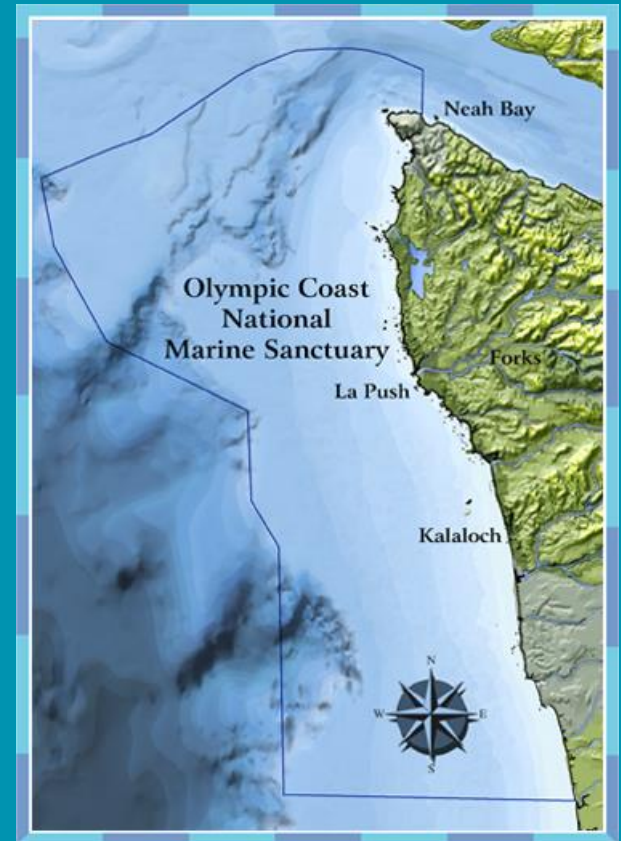
Secondary:  
Quadrocopter

Primary: PUMA



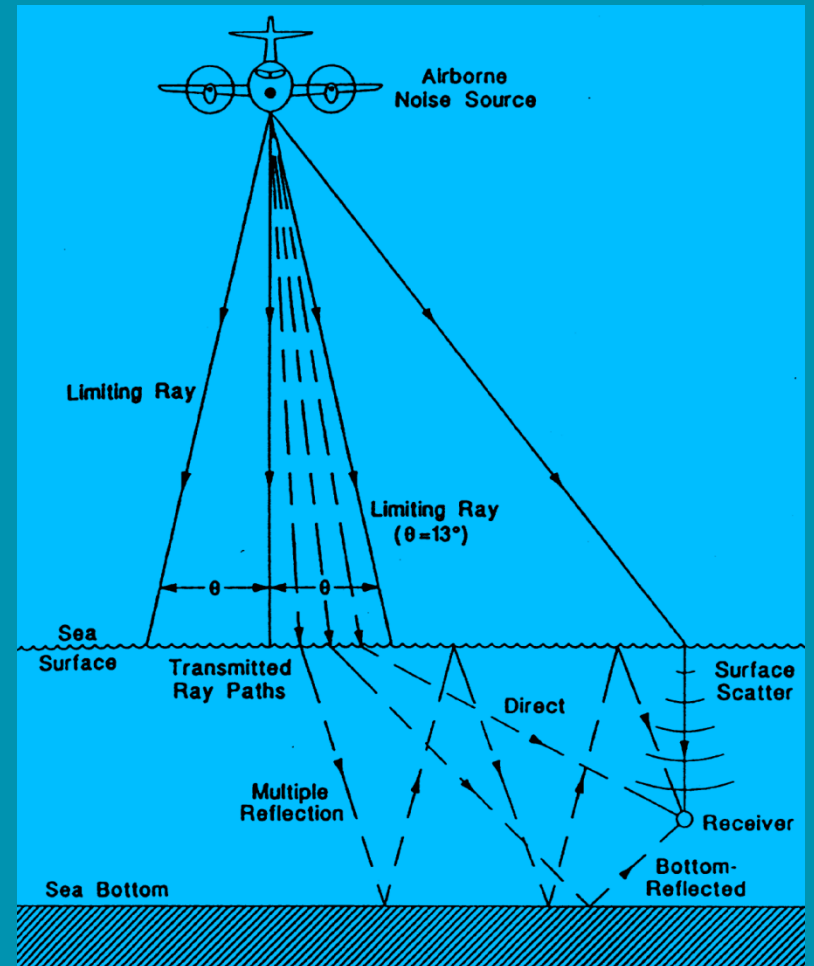
# UAS Mission in OCNMS

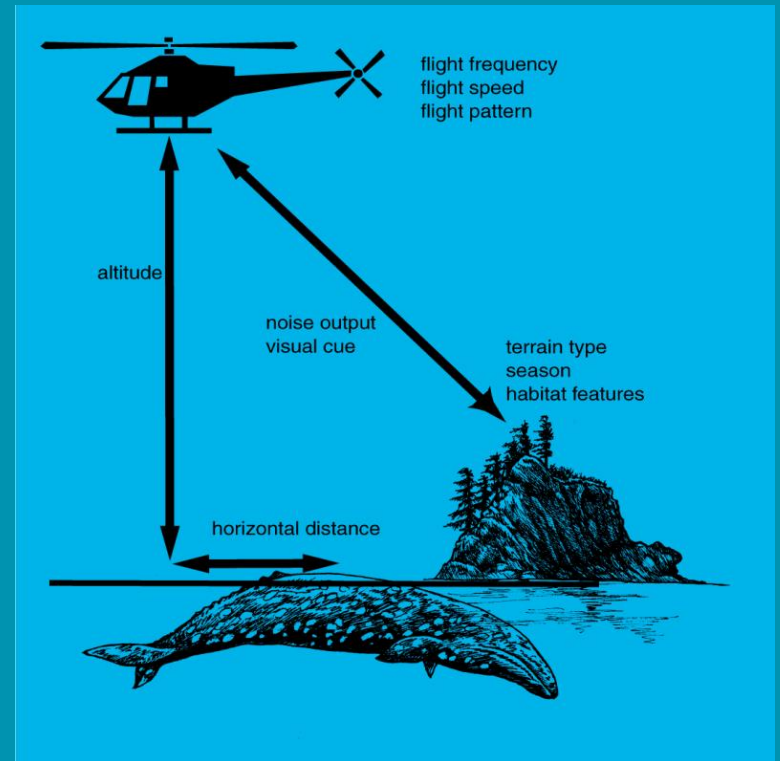
- Seabird colonies (IDs, populations/distributions, reproductive levels)
- Opportunistically monitor sea otters, pinnipeds and cetaceans
- Beach segments for shoreline debris loading
- Offshore zones for tsunami marine debris
- Media and outreach coverage



# Why Test UAS for Aerial Surveys?

- Minimize aircraft (helos, fixed wing) noise disturbance
- Reduce human safety risk during manned aerial surveys
- Reduce operating costs for annual coastal surveys







# What is the PUMA?



- UAS vs. scientific drone
- Launch/recovery from both water and land
- Can fly up to 2,000 ft, normal surveys 250-400 ft
- Flight duration 2 hrs (battery life); 25-40 kts
- Flight ops up to 25 kts wind speed
- Almost no discernible noise at 200 ft. overhead
- 9 ft wingspan; weight 13 lbs
- 5 mp camera (will be upgraded each year)

Link to Puma manufacturer Aero Vironment

[www.avinc.com/uas/small\\_uas/puma](http://www.avinc.com/uas/small_uas/puma)

Link to NOAA's demonstration of Puma missions

[www.youtube.com/watch?v=-lYhVasulyE&feature=youtu.be](http://www.youtube.com/watch?v=-lYhVasulyE&feature=youtu.be)

# Boat Operations - PUMA



# Boat Operations - PUMA



# Boat Operations - PUMA



# Marine Wildlife

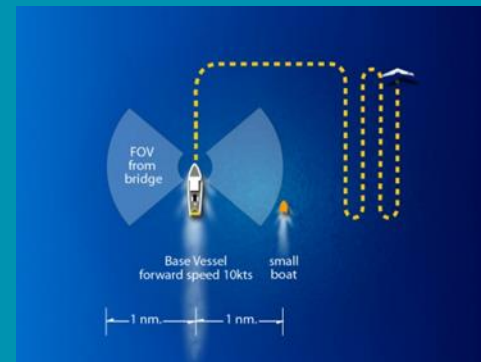
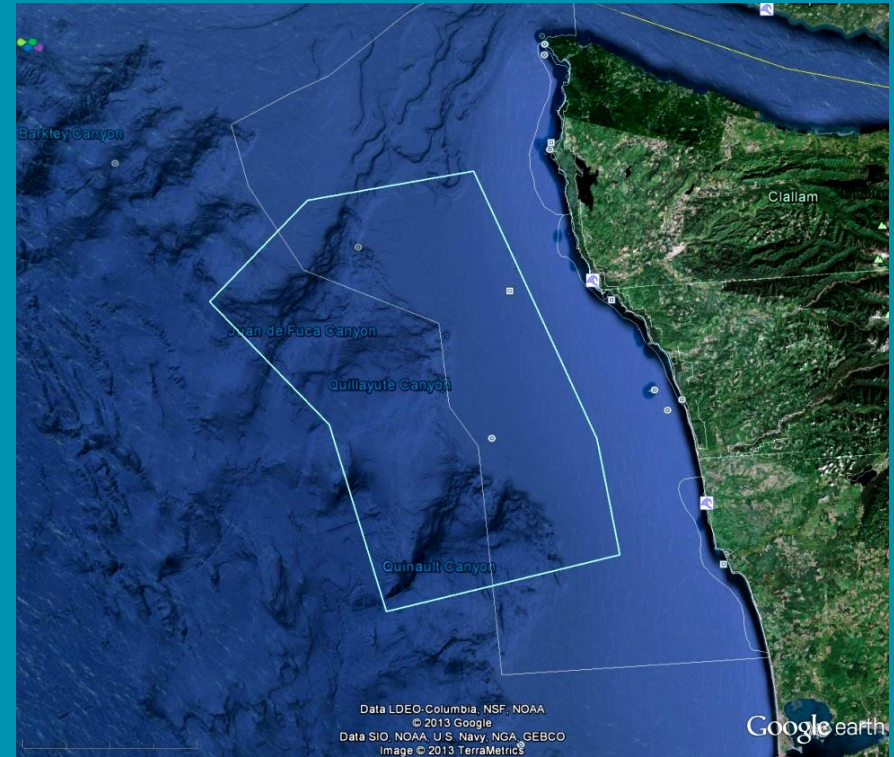


# Beach Debris



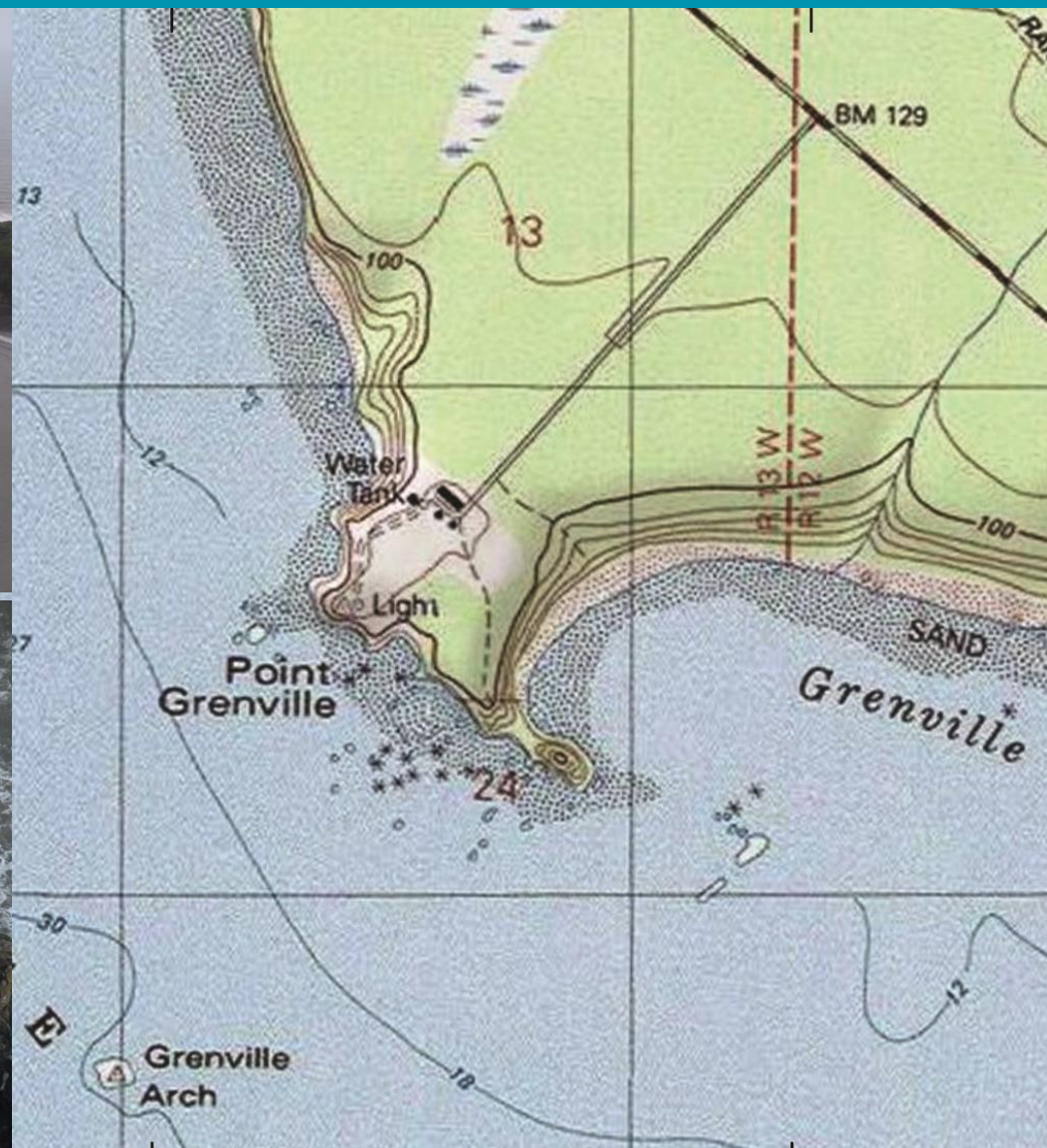
# NOAA Marine Debris Program

- Offshore Detection
  - What
    - Widely dispersed & diverse debris
  - Where
    - Summer upwelling → **Debris offshore**
    - Optimal AO would be ~20-40 miles offshore



**UAS flight pattern  
in relation to  
survey vessel**

# Shore Launch Sites – Pt. Grenville, Quinault Indian Nation



# QUAD Ops – Grenville Beach



# QUAD Ops – Pt. Grenville



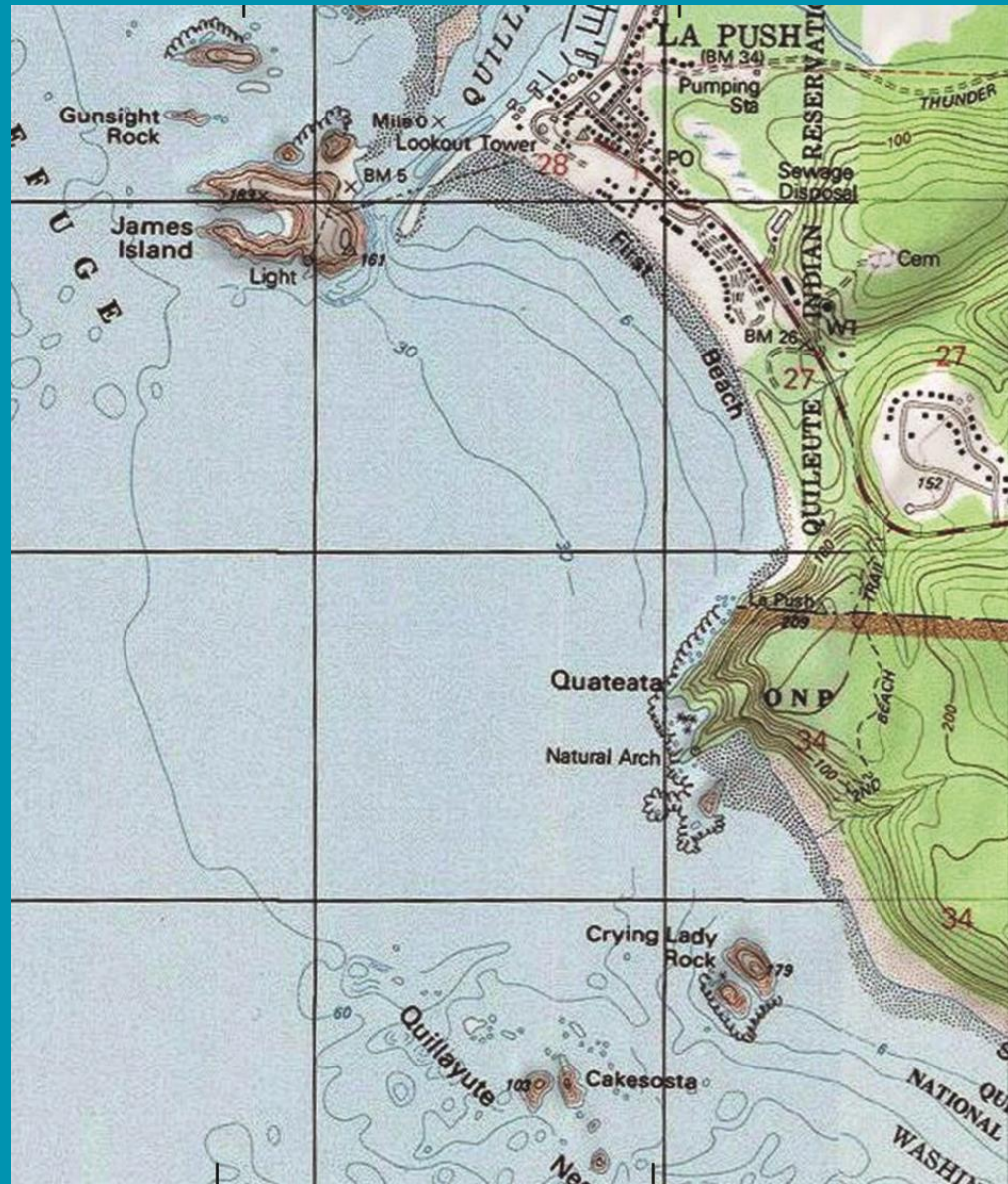


# PUMA Land Take-Off/Landing





# QUAD Ops - La Push, Quileute Tribe



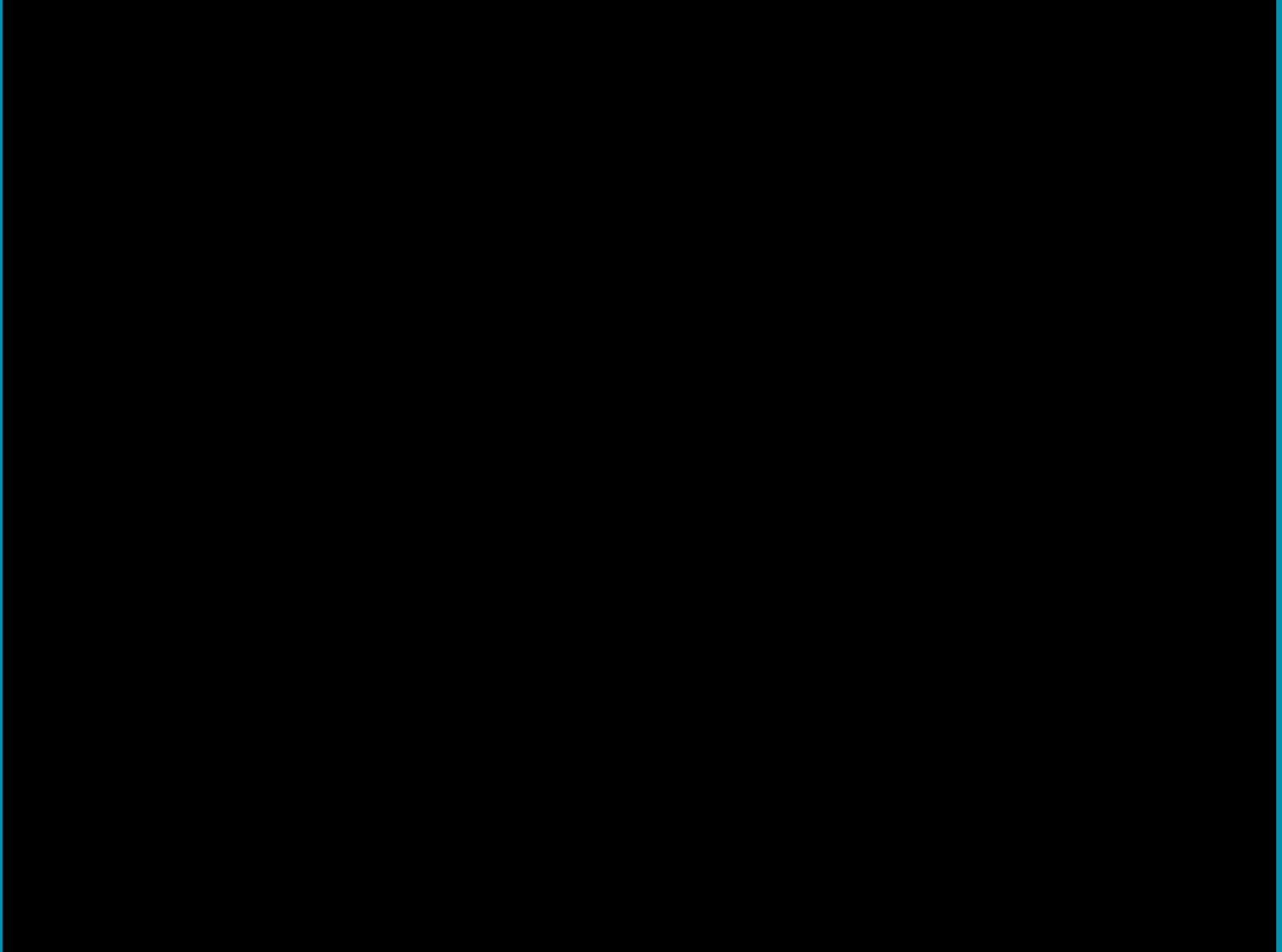
# QUAD Ops - La Push, Quileute Tribe



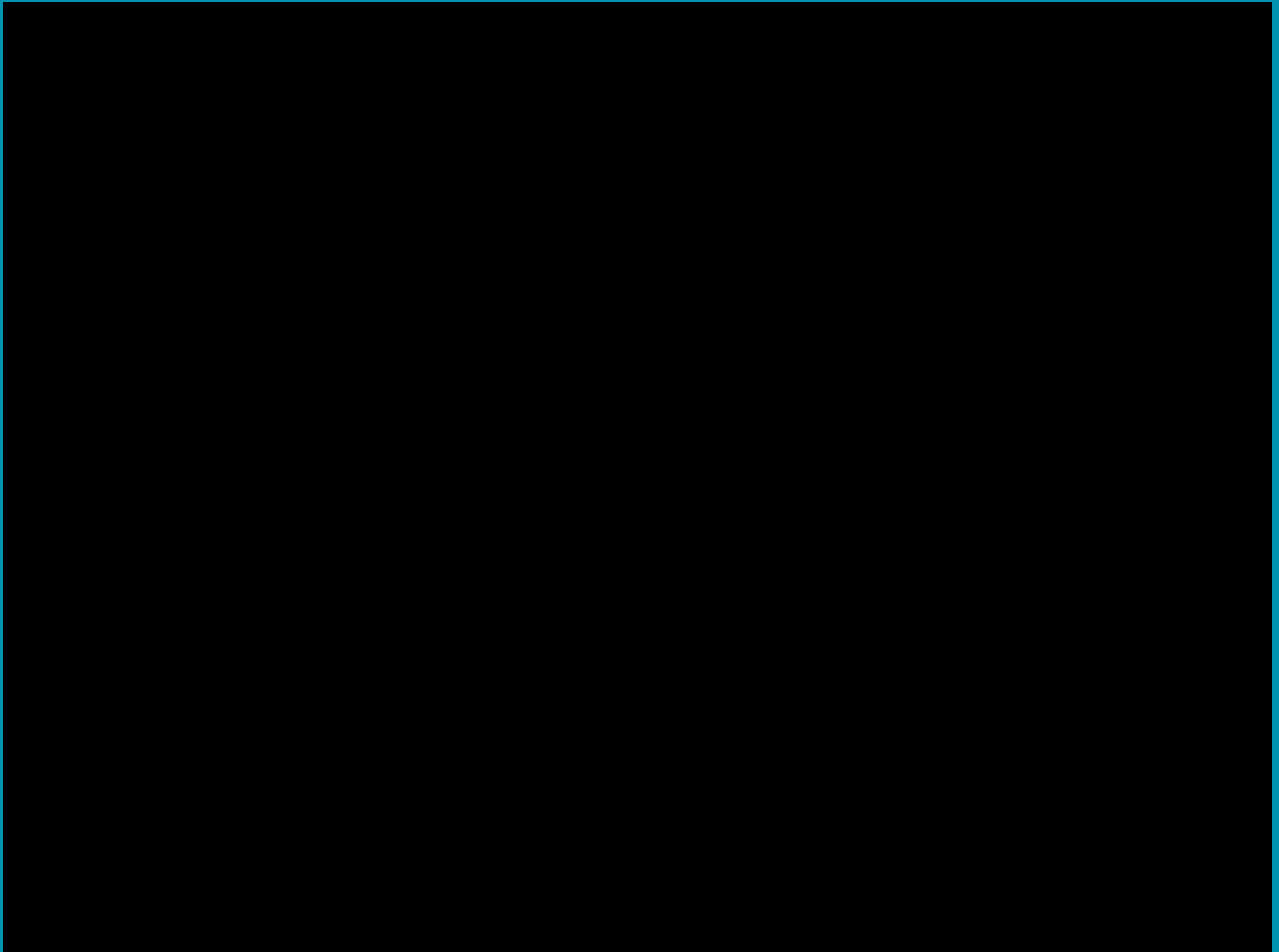
# QUAD Ops – La Push



# PUMA Video Clips



# QUAD Video Clip



# Questions?

